Summary Report for Integrated Mathematics

Glencoe McGraw-Hill *Core-Plus Mathematics, Courses 1-3, Integrated*
Degree of Evidence regarding the Standards for Mathematical Practice: **Moderate Evidence**
Summary of evidence: 1. **Make sense of problems and persevere in solving them**. In the chapters reviewed, there are multiple opportunities for students to analyze the mathematics in context and to explain their findings. Many open-ended questions are presented both in the "Think About This Situation," the "Investigation," and the "On Your Own" sections. Exposure to a variety of representations is present, including models, equations, tables, etc. Through the investigations completed in cooperative learning groups and in the reflection sections, there are frequent opportunities for self and peer reflection. Integration of technology provides additional variety for different types of learners. Overall, there are frequent open-ended problem-solving opportunities for students as they discover the mathematical concepts for themselves. A desirable consequence of the real-world applications is for students to be able to access the mathematics via the scenario. 2. **Reason abstractly and quantitatively**. Application problems are presented throughout the texts and are used to have students investigate the mathematics for themselves. In the chapters reviewed, students are frequently, if not always, led to derive the rules through investigations and then to represent their findings using symbolic notation. There is a gradual building up to the general rule through the investigation work. Accurate units are used throughout the texts. Students work with both exact values and decimal approximations. There are numerous application problems spread throughout each unit as investigations and practice problems. Questions are geared towards students discovering the algorithm or rule for the mathematics presented on their own or in groups, rather than just being presented with it from the start. 3. **Construct viable arguments and critique the reasoning of others**. In the chapters reviewed, there are opportunities for students to explain their reasoning through both the investigations and the practice problems. The texts direct students to be prepared to share their ideas with the class, but it would be up to the teacher to implement the time for discussion. Discussions of justification are limited in the chapters reviewed. The opportunities for students to justify their thinking are available throughout the texts. Overall, these texts provide ways to incorporate the critiquing of the reasoning of others, but will rely some on teacher facilitation of the investigations. 4. **Model with mathematics**. In the chapters reviewed, students are frequently asked to create a model for the problem situation, most often in the form of collecting data, interpreting it, and representing the data with an algebraic model. In the application questions, answers are in context. As students progress in their understanding of the concept covered in the lesson, they experience multiple representations with appropriate infusion of technology. Abundant use of real-world applications evident throughout the texts. There are copious opportunities for students to create and work with models while grappling with the concepts they are asked to discover on their own, often with the use of real-world applications. Students move from the models to the symbolic representations or formulas they have conjectured and tested on their own. 5. **Use appropriate tools strategically.** Students are asked to use a variety of tools within investigations and practice problems. The graphing calculator is incorporated appropriately

throughout the texts. In the chapters reviewed, little evidence was found regarding the evaluation of the strength and weaknesses of certain tools with respect to the problem scenario.

6. **Attend to precision.** Examples use proper notation and are precise. In the chapters reviewed, students are given opportunities to share their solutions and compare their findings within their cooperative learning groups, based on teacher implementation. Prevalence of real-world applications directs attention to the idea of precision. Transition to the abstract model (symbolic) is supported by the generalization of the mathematics in the application. There is attention to precision in the applications. Precision is required through the applications in the scenarios.
7. **Look for and make use of structure**. In the chapters reviewed, there are frequent opportunities for students to complete investigations in order to generalize the mathematical truths and concepts. Students almost always discover the mathematical rule for themselves through the investigations. Most activities explore patterns or data to create generalizations. There is frequent connection to prior learning, with problems constantly spiraling past concepts with the newly acquired concepts. The nature of the integrated approach lends itself to students consistently exploring similar mathematics and extending beyond a particular application. There is a consistency of structure as the material itself provides the strength for students not prone to needing or wanting such structure.
8. **Look for and express regularity in repeated reasoning.** Open-endedness of some applications encourages a variety of approach. Students complete investigations to determine shortcuts. In the chapters reviewed, there are frequent opportunities for students to generalize a pattern to determine a rule. Consistent format in the different sets of problems provided for practice, the connection to prior learning, and the extensions address regularity in reasoning.